


Education Quality and Accountability Office  
**EQAO**

## Understanding the Grade 9 EQAO Assessment of Mathematics

**Dorota Jakubowska**  
**Susanna Martellacci**  
**Dwight Stead**



**Mathematics Professional Learning Menu**

**October 20, 2010**

## Agenda

- Welcome and Introductions
- Anticipation Guide
- Overview of the Grade 9 EQAO Assessment
- Break
- Introduction to Range-Finding
- Lunch
- Range Finding Activity
- Sharing of Results from Range-Finding Activity
- EQAO Resource Bank
- Homework Helper Presentation: Kevin Williams
- Wrap-up / Exit Ticket / Dismissal

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## Catholic Board Learning Plan (CBLP) 2010-2013

**SMART Goal:** Increasing student achievement on EQAO assessments (3, 6 & 9) by 5% by 2013

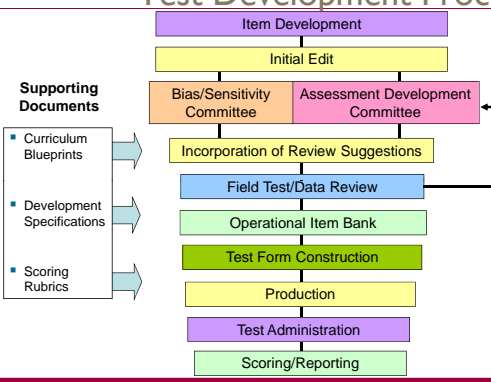
**Foundational Practices:**

- Ontario Curriculum and ministry support documents are the primary sources for all mathematics instruction.
- The mathematical processes described in the Ontario Curriculum are used throughout all mathematics instruction.
- A minimum of 60 minutes is provided daily for mathematical instruction.
- The diverse learning needs of EACH student are supported by mathematical instruction, assessment and evaluation that are varied in nature and provide multiple opportunities to demonstrate learning.
- The comprehensive list of strategies that relate to effective mathematics instruction are used regularly.

**Expected Practice:** By June 2013, all mathematics instruction will be delivered using a 3-part lesson model

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## Test Development Process



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## Test Development Process

**All questions (items) are developed by Ontario teachers**



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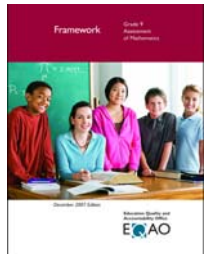
## Linking EQAO Data to The Ontario Curriculum

**Framework Documents:**

**The assessment frameworks:**

- Provide a detailed description of the assessments':
  - Purpose and benefits
  - Large scale vs. classroom
  - What is reported
  - Make-up of assessments
  - Curriculum connections
  - Description of scoring
  - Comparability

Download from [www.eqao.com](http://www.eqao.com)




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## Large-Scale Assessment

### A Value-Added Resource

**Large-Scale Assessment**  
Another lens to enhance student achievement data analysis



**Classroom Assessment**  
The richest source of student achievement data



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## Large-Scale Assessment


### A Value-Added Resource

Serving Different Purposes

**Large-Scale Assessment**  
Purpose – to provide comparable year-to-year data  
Data informs improvement planning and target setting  
Created and scored “at a distance”  
  
Presents a snapshot of student achievement (summative)  
  
Administered, scored and reported in a consistent and standard manner  
  
Provides the same items for all students

**Classroom Assessment**  
Purpose - to reports regularly on student achievement  
Data provides students with info for self-evaluation and goal setting  
Created and marked by the classroom teacher  
  
Administered at regular intervals over time (diagnostic, formative, summative)  
Involves a variety of supports, variation in administration procedures and time allowed, and teacher autonomy in marking  
Allows for modified items and tasks tailored to needs of individual or groups of students

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## How Do the Assessments Align with *The Ontario Curriculum*?

**EQAO's assessments are large-scale standards-referenced assessments:**

- The assessments for the Primary and Junior divisions and grade 9 are based on the *Ontario Curriculum* expectations and the Ministry of Education's levels of achievement for student performance
- The OSSLT is based on the *Ontario Curriculum expectations* requiring reading and writing across all subjects to the end of grade 9

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## Purpose of the Grade 9 Mathematics Assessments?

- To assess students and report yearly data on the level at which students are meeting curriculum expectations in the grade 9 Academic and Applied Mathematics courses.
- To report for individuals, schools, boards and the province.

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## Grade 9 Assessments of Mathematics

### Technical Details

**ITEMS**

↓

**Types**

Multiple Choice

Open Response

	Multiple-Choice Items	Open-Response Items	Total Items
Operational	24	7	31
Field Test	3	1	4
<b>Total Items for Each Student</b>	<b>27</b>	<b>8</b>	<b>35</b>

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## more details..

Operational Item Type	Number of Raw Score Points	Percentage of Total Raw Score Points
Multiple-Choice	24	80%
Open-Response	8	20%
<b>Total</b>	<b>32</b>	<b>100%</b>

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more details..

#### FORMAT OF THE ASSESSMENT

DAY 1: BOOKLET 1 50 MINUTES

- seven multiple-choice questions
- four open-response questions
- seven multiple-choice questions

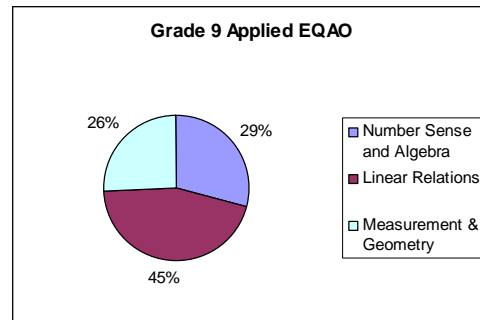
DAY 2: BOOKLET 2 50 MINUTES

- seven multiple-choice questions
- four open-response questions
- six multiple-choice questions

17

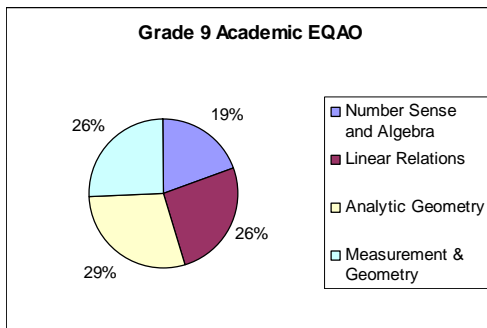
#### EQAO Strand Percentages

Grade 9 Applied EQAO



#### EQAO Strand Percentages

Grade 9 Academic EQAO



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#### Levels of Difficulty and MC

**Multiple-choice questions are developed and used to distinguish performance levels.**

- Easy: distinguish between Level 1 and 2 performances.
- Medium: distinguish between Level 2 and 3 performances.
- Challenging: distinguish between Level 3 and 4 performances.

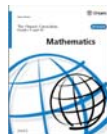


Categories of the Achievement Chart

#### The Achievement Chart provides:

descriptions of four categories of knowledge and skills

- Knowledge and Understanding
- Thinking
- Communication
- Application



Categories of the Achievement Chart

#### Knowledge and Understanding - KU

These items require students to demonstrate:

- subject specific content (knowledge)
- the comprehension of its meaning and significance (understanding)

e.g. use the Pythagorean Theorem to find the length of the missing side.



## Thinking - PS

These items require students to:

- select and sequence a variety of tools to solve a problem
- demonstrate a critical-thinking process.

To answer the question, students need to make a plan.



## Application - AP

These items require students to:

- select the appropriate “tool” or get the necessary information
- “fit” it to the problem.

E.g. Determine the amount of soup the cylindrical can contains.



## What's the difference between KU and AP?

If you tell the student what procedure to perform then the skill is usually **KU**.

If the student must decide what procedure to perform then the skill is usually **AP**.

In **AP**, the context is integral to the item.

## What's the difference between PS and AP?

Anything to do with the problem-solving process is Thinking (**PS**).

The selection and fitting of a single mathematical tool is Application (**AP**).

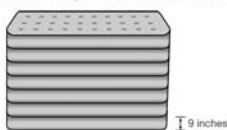
If the student needs to make a plan, then the item is Thinking (**PS**).

## Scoring Open-Response

Applied Spring 2009

### Stacked High

A mattress company has 7000 mattresses to sell. The company claims that if all the mattresses are stacked on top of each other, the stack will be 3 times the height of the CN Tower.



#### Hint:

1 inch = 2.5 cm  
1 m = 100 cm

The height of the CN Tower is 553 m and each mattress is 9 inches high. Is the company's claim true?

Justify your answer.

## 4 CODES OF PERFORMANCE

40

30

20

10

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The Achievement Chart


## Levels of Achievement

**Level 4: thorough/high degree**

**Level 3: considerable**

**Level 2: some**

**Level 1: limited**



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### Generic Rubric: Mathematics Open-Response Items

Code	Descriptor
10	<ul style="list-style-type: none"> <li>demonstration of limited understanding of concepts and/or procedures</li> <li>application of knowledge and skills shows limited effectiveness due to               <ul style="list-style-type: none"> <li>misunderstanding of concepts</li> <li>incorrect selection or misuse of procedures</li> </ul> </li> <li>problem-solving process shows limited effectiveness due to               <ul style="list-style-type: none"> <li>minimal evidence of a solution process</li> <li>limited identification of important elements of the problem</li> <li>too much emphasis on unimportant elements of the problem</li> <li>no conclusions presented</li> <li>conclusion presented without supporting evidence</li> </ul> </li> </ul>
20	<ul style="list-style-type: none"> <li>demonstration of some understanding of concepts and/or procedures</li> <li>application of knowledge and skills shows some effectiveness due to               <ul style="list-style-type: none"> <li>partial understanding of the concepts</li> <li>errors and/or omissions in the application of the procedures</li> </ul> </li> <li>problem-solving process shows some effectiveness due to an incomplete solution process</li> <li>identification of some of the important elements of the problem</li> <li>some understanding of the relationships between important elements of the problem</li> <li>simple conclusions with little supporting evidence</li> </ul>
30	<ul style="list-style-type: none"> <li>demonstration of considerable understanding of concepts and/or procedures</li> <li>application of knowledge and skills shows considerable effectiveness due to               <ul style="list-style-type: none"> <li>an understanding of most of the concepts in spite of minor errors and/or omissions in the application of the procedures</li> </ul> </li> <li>problem-solving process shows considerable effectiveness due to               <ul style="list-style-type: none"> <li>a solution process that is nearly complete</li> <li>identification of most of the important elements of the problem</li> <li>a considerable understanding of the relationships between important elements of the problem</li> <li>appropriate conclusions with supporting evidence</li> </ul> </li> </ul>
40	<ul style="list-style-type: none"> <li>demonstration of thorough understanding of concepts and/or procedures</li> <li>application of knowledge and skills shows a high degree of effectiveness due to               <ul style="list-style-type: none"> <li>a thorough understanding of the concepts</li> <li>an accurate application of the procedures (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding)</li> </ul> </li> <li>problem-solving process shows a high degree of effectiveness due to               <ul style="list-style-type: none"> <li>a complete solution process</li> <li>identification of all important elements of the problem</li> <li>a thorough understanding of the relationships between all of the important elements of the problem</li> <li>appropriate conclusions with thorough and insightful supporting evidence</li> </ul> </li> </ul>

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### Generic Rubric: Mathematics

#### Code 30

Code	Descriptor
30	<ul style="list-style-type: none"> <li>demonstration of <b>considerable</b> understanding of concepts and/or procedures</li> <li>application of knowledge and skills shows <b>considerable</b> effectiveness due to               <ul style="list-style-type: none"> <li>an understanding of <b>most</b> of the concepts in spite of minor errors and/or omissions in the application of the procedures</li> </ul> </li> <li>problem-solving process shows <b>considerable</b> effectiveness due to               <ul style="list-style-type: none"> <li>a solution process that is <b>nearly</b> complete</li> <li>identification of <b>most</b> of the important elements of the problem</li> <li>a <b>considerable</b> understanding of the relationships between important elements of the problem</li> <li>appropriate conclusions with supporting evidence</li> </ul> </li> </ul>

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## Educators

Assessment of Reading, Writing and Mathematics, Primary Division (Grades 1-3) and Junior Division (Grades 4-6)

The Assessments of Reading, Writing and Mathematics (ARWMT) (Grades 1-3) and Junior Division (Grades 4-6) are based on the reading, writing and mathematics expectations in The Ontario Curriculum, Grades 1-3. These assessments provide both individual and system data on student achievement.

Grade 9 Assessment of Mathematics

The Grade 9 Assessment of Mathematics provides individual and system data on students' knowledge and skills, based on the expectations for students in Grade 9 applied and academic programs in The Ontario Curriculum, Grades 9 and 10. Mathematics. All students in these programs are required to participate in the assessment.

Ontario Secondary School Literacy Test

The purpose of the Ontario Secondary School Literacy Test (OSSLT) is to ensure that students have acquired the essential reading and writing skills that apply to all subject areas in the provincial curriculum up to the end of Grade 10. All students in public and private schools who are working toward an Ontario Secondary School Diploma are required to write the OSSLT in Grade 10. Students who have been eligible to write the OSSLT at least twice and have been unsuccessful at least once are eligible to fulfill the requirement through the Ontario Secondary School Literacy Course (OSSLC). (Principals have the discretion to allow students to enroll in the course before they have a second opportunity to take the test, if the principal determines that it is in the best educational interests of the student.) Ministry of Education Policy/Program Memorandum 12/1: Successful completion of the OSSLT or OSSLC is a graduation requirement.

Every student who writes the Grade 3 or Grade 6 assessment of Reading, Writing and Mathematics, the Grade 9 Assessment of Mathematics or the OSSLT receives an Individual Student Report. EQAO also releases province, school board and school results.

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## Educators

Grade 9 Assessment of Mathematics

Frequently Asked Questions • Key Dates • Primary and Junior Divisions • OSSLT

EQAO's Technical Report for the 2007-2008 Assessments

This report outlines the technical features and professional expertise that were used to ensure the accuracy, validity and psychometric integrity of the EQAO assessments administered in 2007-2008. [Download PDF](#) | 11 pages | 527K | Posted 12-04-08

2008-2009 Bulletin for Teachers

[Download PDF](#) | 2 pages | 59K | Posted 12-11-08

Administering the Grade 9 Assessments of Mathematics, Winter and Spring 2009

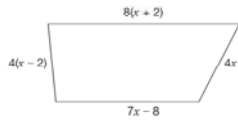
This guide has been developed to provide direction and information to principals and teachers administering the Grade 9 assessment of Mathematics in winter or spring 2009. Administering the assessment according to the guidelines in this document will ensure province-wide consistency before, during and after the administration.

[Download PDF](#) | 17 pages | 252K | Posted 11-28-08

## Field Maintenance

### Field Maintenance

A field in the shape of a trapezoid has a perimeter of 460 m. A fence is being built along the field's perimeter.



Determine the length of fencing needed for each side of the field.  
Show your work.

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## Clarence's Quandary

### Clarence's Quandary

Clarence works at a veterinarian's office. He needs to give a dose of medicine to a 24 kg dog. The recommended dosage for a dog that weighs 10 kg is 25 mL. Determine the dose Clarence should give to the 24 kg dog if the rate remains the same. Show your work.

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## Overview of Procedure:

1. Score Student Samples
2. Consensus score student samples in groups of 3 or 4
3. Select anchor papers
4. Write annotations

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## Detailed Procedure:

1. Pick two student samples of each code (10, 20, 30 & 40)
2. All group members **MUST** agree for the 8 samples
3. From each pair pick one anchor for each of code 10, 20, 30 & 40
4. Write descriptions of the characteristics of your choice.
5. Post your four anchors.

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## Test Development Process

**All questions  
(items) are  
developed by  
Ontario teachers**



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## Wrap Up

- Complete the "After" column of your Anticipation Guide
- Questions? Comments?
- **Think / Pair / Share**
  - What effective strategies have you used to prepare your students for EQAO?
- The materials from today's session will be posted on the wiki:  
<http://dpcdsb-eqao.wikispaces.com/Preparation+Resources>
- Questions? Comments?

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## Contact Information

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- Susanna Martellacci – Academic Consultant Mathematics (7-10) x24373
- Dwight Stead – Mathematical Literacy Consultant (7-12) x24533

